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What is claimed is:

1. A process for treating a metal surface comprising contacting said metal surface during a conversion treatment with a ready-to-use application solution which is comprised of:
 - a) 0.02 to 20 g/l of at least one substance selected from the group consisting of phosphoric acid, fluoric acids of one or more elements selected from Zr, Ti, Hf and Si and the respective anions thereof; and
 - b) 10 to 49.9 mg/l of at least one polymer selected from the group consisting of homo- and copolymers of vinylpyrrolidone;wherein said ready-to-use application solution is free of divalent metals when component a) contains phosphoric acid or anions of phosphoric acid.
2. A process according to claim 1, wherein said ready-to-use application solution is free of nickel and chromium.
3. A process according to claim 1, wherein the at least one polymer contains caprolactam groups.
4. A process according to claim 1, wherein the metal surface is treated using an aqueous solution of an acid prior to being contacted with said ready-to-use application solution.
5. A process according to claim 1, wherein said ready-to-use application solution comprises 5 to 20 g/l of at least one substance selected from the group consisting of phosphoric acid and phosphate ions.
6. A process according to claim 1, wherein said ready-to-use application solution comprises 8 to 16 g/l of at least one substance selected from the group consisting of phosphoric acid and phosphate ions.

7. A process according to claim 1, wherein said ready-to-use application solution comprises at least one substance selected from the group consisting of fluoric acids of one or more elements selected from Zr, Ti, Hf and Si and the respective anions thereof in a quantity such that said one or more elements are present at a concentration of 20 to 1000 mg/l.
8. A process according to claim 1, wherein said ready-to-use application solution comprises at least one substance selected from the group consisting of fluoric acids of one or more elements selected from Zr, Ti, Hf and Si and the respective anions thereof in a quantity such that said one or more elements are present in a concentration of 50 to 400 mg/l.
9. A process according to claim 1, wherein said ready-to-use application solution comprises 20 to 45 mg/l of at least one polymer selected from the group consisting of homo- and copolymers of vinylpyrrolidone.
10. A process according to claim 1, wherein said ready-to-use application solution has a pH of 2 to 5.5.
11. A process according to claim 1, wherein said metal surface does not have an anticorrosive layer thereon prior to said contacting.
12. A process according to claim 1, wherein said metal surface has an anticorrosive layer thereon prior to said contacting.
13. A process for treating a metal surface comprising contacting said metal surface during a conversion treatment with a ready-to-use application solution which has a pH of 2 to 5.5 and is comprised of:
- a) at least one substance selected from the group consisting of fluoric acids of one or more elements selected from Zr, Ti, Hf and Si and the respective anions thereof in a quantity

such that said one or more elements are present in a concentration of 20 to 1000 mg/l; and

b) 20 to 45 mg/l of at least one polymer containing caprolactam groups selected from the group consisting of homo- and copolymers of vinylpyrrolidone; wherein said ready-to-use application solution is free of nickel and chromium.

14. A process according to claim 13, wherein said ready-to-use application solution is comprised of H_2ZrF_6 acid.

15. A process according to claim 13, wherein the metal surface is treated using an aqueous solution of an acid prior to being contacted with said ready-to-use application solution.

16. A process according to claim 13, wherein said metal surface does not have an anticorrosive layer thereon prior to said contacting.

17. A process according to claim 13, wherein said metal surface has an anticorrosive layer thereon prior to said contacting.

18. A process according to claim 17, wherein said anticorrosive layer is comprised of phosphate.